

CLAIMS

What is claimed is:

1 1. A method for reducing spurious emissions in an amplified signal, comprising the steps of:

2 (a) receiving an input signal; and

3 (b) applying frequency-dependent phase pre-distortion to the input signal to generate a pre-distorted
4 output signal, such that, when the pre-distorted output signal is applied to an amplifier to generate the
5 amplified signal, the frequency-dependent phase pre-distortion reduces spurious emissions in the
6 amplified signal.

1 2. The invention of claim 1, wherein step (b) comprises the steps of:

2 (1) generating a main output signal from the input signal;

3 (2) generating one or more frequency-dependent phase pre-distortion signals from the input signal;

4 and

5 (3) advancing or delaying each frequency-dependent phase pre-distortion signal relative to the main
6 output signal; and

7 (4) combining each advanced or delayed frequency-dependent phase pre-distortion signal with the
8 main output signal to generate the pre-distorted output signal.

1 3. The invention of claim 2, wherein step (b)(1) comprises the step of applying frequency-
2 independent magnitude and phase pre-distortion to the input signal to generate the main output signal.

3 4. The invention of claim 2, wherein each frequency-dependent phase pre-distortion signal is based
4 on a corresponding phase difference between a pair of critical frequencies.

1 5. The invention of claim 4, wherein step (b)(3) comprises the step of advancing or delaying each
2 frequency-dependent phase pre-distortion signal relative to the main output signal based on the frequency
3 difference between the corresponding pair of critical frequencies.

1 6. The invention of claim 4, wherein step (b)(2) comprises the step of generating two or more
2 different frequency-dependent phase pre-distortion signals from the input signal based on two or more
3 different pairs of critical frequencies.

1 7. The invention of claim 1, wherein the input signal is a baseband signal and the frequency-
2 dependent phase pre-distortion is applied in the baseband domain.

1 8. The invention of claim 1, wherein the input signal is an RF signal and the frequency-dependent
2 phase pre-distortion is applied in the RF domain.

1 9. The invention of claim 1, wherein the frequency-dependent phase pre-distortion is based on data
2 retrieved from one or more look-up tables.

1 10. The invention of claim 9, wherein the one or more look-up tables are adaptively updated
2 according to control signals generated based on the amplified signal.

1 11. The invention of claim 1, wherein:

2 step (b) comprises the steps of:

3 (1) applying frequency-independent magnitude and phase pre-distortion to the input signal to
4 generate a main output signal;

5 (2) generating one or more frequency-dependent phase pre-distortion signals from the input
6 signal, wherein each frequency-dependent phase pre-distortion signal is advanced or delayed relative to
7 the main output signal based on the frequency difference between the corresponding pair of critical
8 frequencies; and

9 (3) advancing or delaying each frequency-dependent phase pre-distortion signal relative to the
10 main output signal; and

11 (4) combining each advanced or delayed frequency-dependent phase pre-distortion signal with
12 the main output signal to generate the pre-distorted output signal;

13 each frequency-dependent phase pre-distortion signal is based on a corresponding phase difference
14 between a pair of critical frequencies;

15 the frequency-dependent phase pre-distortion is based on data retrieved from one or more look-up
16 tables, wherein the one or more look-up tables are adaptively updated according to control signals
17 generated based on the amplified signal

1 12. The invention of claim 11, wherein step (b)(2) comprises the step of generating two or more
2 different frequency-dependent phase pre-distortion signals from the input signal based on two or more
3 different pairs of critical frequencies.

1 13. The invention of claim 11, wherein the input signal is a baseband signal and the frequency-
2 dependent phase pre-distortion is applied in the baseband domain.

1 14. The invention of claim 11, wherein the input signal is an RF signal and the frequency-dependent
2 phase pre-distortion is applied in the RF domain.

1 15. An apparatus for reducing spurious emissions in an amplified signal, wherein the apparatus is
2 configured to:

- 3 (a) receive an input signal; and
4 (b) apply frequency-dependent phase pre-distortion to the input signal to generate a pre-distorted
5 output signal, such that, when the pre-distorted output signal is applied to an amplifier to generate the
6 amplified signal, the frequency-dependent phase pre-distortion reduces spurious emissions in the
7 amplified signal.

1 16. The invention of claim 15, wherein the apparatus comprises:

- 2 (a) a main signal processing path configured to generate a main output signal from the input signal;
3 (b) one or more frequency-dependent phase pre-distortion paths configured to generate one or more
4 frequency-dependent phase pre-distortion signals from the input signal;
5 (c) one or more delay blocks configured to advance or delay each frequency-dependent phase pre-
6 distortion signal relative to the main output signal; and
7 (4) a combiner configured to combine each advanced or delayed frequency-dependent phase pre-
8 distortion signal with the main output signal to generate the pre-distorted output signal.

1 17. The invention of claim 16, wherein the main signal processing path is configured to apply
2 frequency-independent magnitude and phase pre-distortion to the input signal to generate the main output
3 signal.

1 18. The invention of claim 16, wherein each frequency-dependent phase pre-distortion signal is
2 based on a corresponding phase difference between a pair of critical frequencies.

1 19. The invention of claim 18, wherein the one or more delay blocks advance or delay each
2 frequency-dependent phase pre-distortion signal relative to the main output signal based on the frequency
3 difference between the corresponding pair of critical frequencies.

1 20. The invention of claim 18, comprising two or more frequency-dependent phase pre-distortion
2 paths configured to generate two or more different frequency-dependent phase pre-distortion signals from
3 the input signal based on two or more different pairs of critical frequencies.

1 21. The invention of claim 15, wherein the input signal is a baseband signal and the apparatus applies
2 the frequency-dependent phase pre-distortion in the baseband domain.

1 22. The invention of claim 15, wherein the input signal is an RF signal and the apparatus applies the
2 frequency-dependent phase pre-distortion in the RF domain.

1 23. The invention of claim 15, wherein the apparatus retrieves data for the frequency-dependent
2 phase pre-distortion from one or more look-up tables.

1 24. The invention of claim 23, wherein the apparatus adaptively updates the one or more look-up
2 tables according to control signals generated based on the amplified signal.

3 25. A machine-readable medium, having encoded thereon program code, wherein, when the program
4 code is executed by a machine, the machine implements a method for reducing spurious emissions in an
5 amplified signal, comprising the steps of:

6 (a) receiving an input signal; and

7 (b) applying frequency-dependent phase pre-distortion to the input signal to generate a pre-distorted
8 output signal, such that, when the pre-distorted output signal is applied to an amplifier to generate the
9 amplified signal, the frequency-dependent phase pre-distortion reduces spurious emissions in the
10 amplified signal.